

1. PROJECT CODE SA-AMS		2. JPIC CODE AMS		AMS-02 TASK SHEET (ATS)			
3. TYPE	A	CONFIGURATION CHANGE		<input checked="" type="checkbox"/>	4. ATS NO. TTCS-BOX-HX-001		5. PAGE 1 OF 31
		PERMANENT	<input type="checkbox"/>	TEMPORARY	<input checked="" type="checkbox"/>	6. MOD SHEET(S) NUMBER(S)	
	B	NONCONFIGURATION CHANGE		<input type="checkbox"/>			
10. PART NAME AMS02				11. Sub Detector Name TRACKER-TTCS BOX		12. SERIAL/LOT NO. NA	
14. APPLICABLE DOCUMENTS							
18. ATS TITLE TTCS-HX Sub-assembly installation							
20. OPER SEQ. NO.		21. OPERATIONS (Print, Type, or Write Legibly)				VERIFICATION	
						22. TECH	23. QA/DV
		<p align="center"><u>NOTE CAUTION WARNING</u></p> <p align="center">THIS ATS COVERS ALL THE INTEGRATION STEPS NEEDED FOR THE TTCS-HX INSTALLATION</p> <p align="center">The purpose of this ATS is to specify the HX installation of the TTCS boxes, that will be performed at AIDC Taiwan.</p> <p align="center">The Project Engineer: Johannes van Es (TTCS) has the option to reorder steps on site as required.</p> <p align="center">HANDLING AND HARDWARE INSTALLATION</p> <p align="center">Each operation on FM Hardware shall be done wearing gloves and in according to the following instructions</p> <p align="center">All the integration activities shall be done by qualified personnel.</p> <p align="center">The TTCS Project Engineer has the authority to work the steps in this ATS out of order.</p>					
24. ORIGINATOR J. van Es				DATE	25. FINAL ACCEPTANCE STAMP AND DATE		
APPROVALS (Printed or Typed and Signed)							
26. PROJECT ENGINEER J. van Es				DATE	27. QUALITY ENGINEER		DATE
28.					29.		
30.					31.		

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001
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	<div></div> <p>Figure 2</p>		

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001																																						
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	<p><u>APPLICABLE DOCUMENTS</u></p> <p>The following documents in the latest applicable issue form a part of this plan to the extent specified herein:</p> <table><tr><th>AD</th><th>Document ID</th><th>Issue/Rev</th><th>Title</th></tr><tr><td>1</td><td>ET6029-04-031</td><td>F/</td><td>ASSY HX FM P</td></tr><tr><td>2</td><td>ET6029-04-019</td><td>H/</td><td>HX FM P CLIP AND SUPPORT</td></tr><tr><td>3</td><td>ET5998-06-10</td><td>D/</td><td>TTCB FM Assembly base</td></tr><tr><td>4</td><td>ET5998-06-01</td><td>E/</td><td>ASSY TTCB P FM</td></tr><tr><td></td><td></td><td></td><td></td></tr></table> <p><u>STANDARD AND SPECIAL TOOLS</u></p> <p>For the hardware installation a standard tool shall be used. Where the use of standard tooling is not possible, special tool may be employed. Each special tool has to be identified with its Drawing Number marked, in indelible way, on the same tool All the tools have to be clean and free from dust and grease. For the present installation only standard tools are needed</p> <p><u>RUNNING TORQUE MEASUREMENT</u></p> <p>In the present integration activity we have to consider only two types of locking as coupling. One by Insert Thread Locked In (MS21209 F1-20L .19-32 UNF 3A) and screw (MS2469C52 .19-32 UNF 3A). And the second type by insert MS21209F1-15 The expected Locking (running) torque value, relative to MS2469C52 and NAS 3151-N3-10 screw is reported in the following table. This value is an output from Specification MIL-I-45914A</p> <table><tr><th>BOLT TYPE</th><th>BOLT SIZE</th><th>MIN LOCKING TORQUE [in*lbF]</th><th>MAX LOCKING TORQUE [in*lbF]</th></tr><tr><td>MS2469C52</td><td>.19-32 UNF 3A</td><td>1 (TBC)</td><td>6 (TBC)</td></tr><tr><td>NAS 1352-N3-10</td><td>.19-32 UNF 3A</td><td>1 (TBC)</td><td>6 (TBC)</td></tr></table> <p>Since it is a continuous torque it is necessary to measure it with an analogical torque wrench, obtaining the maximum torque applied during this operation. The Locking Torque value has to be written in the relative box in the Integration Procedure Table and added to the Seating Torque required in the structural analysis, (and reported in the engineering drawings)</p>			AD	Document ID	Issue/Rev	Title	1	ET6029-04-031	F/	ASSY HX FM P	2	ET6029-04-019	H/	HX FM P CLIP AND SUPPORT	3	ET5998-06-10	D/	TTCB FM Assembly base	4	ET5998-06-01	E/	ASSY TTCB P FM					BOLT TYPE	BOLT SIZE	MIN LOCKING TORQUE [in*lbF]	MAX LOCKING TORQUE [in*lbF]	MS2469C52	.19-32 UNF 3A	1 (TBC)	6 (TBC)	NAS 1352-N3-10	.19-32 UNF 3A	1 (TBC)	6 (TBC)		
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NAS 1352-N3-10	.19-32 UNF 3A	1 (TBC)	6 (TBC)																																						

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				22. TECH	23. QA/DV																								
	<p><u>FINAL INSTALLATION TORQUE MEASUREMENT</u></p> <p>Final Torque to be applied to each screw is the result of the sum of the Locking Torque (measured) and the Seating Torque prescribed from the structural analysis (and reported also on the engineering drawing). The Seating torques to be applied for each screws are listed in this ATS The entire torque shall be applied using calibrated torque wrench</p> <p>TORQUE (T)= SEATING TORQUE (ST) +LOCKING TORQUE (RT)</p> <ul style="list-style-type: none">• SEATING TORQUE (from structural analysis)• LOCKING (= RUNNING) TORQUE (measured) <p><u>LUBRICATION</u></p> <p>All these fasteners shall be installed in <u>LUBRICATED</u> condition (according to the structural analysis)</p> <p>The below Step by Step procedure, have to be followed for all the fittings to be used for the parts installation.</p> <table><thead><tr><th>STEP</th><th>OFF-LINE MEASUREMENT STEPS</th></tr></thead><tbody><tr><td>1</td><td>Clean screws and washers in an Isopropyl Alcohol bath</td></tr><tr><td>2</td><td>Let the screws and washers dry on a clean towel</td></tr><tr><td>3</td><td>Perform a screws and washers visual Inspection</td></tr><tr><td>4</td><td>Install the HX supports on the HX dummy support plate fasten by hand the screws of the intended tube side of the HX and torque with tool to 75% of the final torque value</td></tr><tr><td>5</td><td>Fasten the screws of the support on the non-tube by hand loosely so 2 mm room is left between bolt and support</td></tr><tr><td>6</td><td>Install the HX on top of the supports in the correct orientation</td></tr><tr><td>7</td><td>Install the clip on the HX tubes side on the HX support. Fasten the clip screws alternating by hand.</td></tr><tr><td>8</td><td>Torque the 4 bolts to a value of 80% of the final torque</td></tr><tr><td>9</td><td>Measure on both sides the room between clip and support with spacers (thickness gauging tools)</td></tr><tr><td>10</td><td>Design & manufacture shims for the side with the largest spacer thickness based on the measured spacer thickness.</td></tr><tr><td>11</td><td>With clip 1 still installed perform the steps 8-10 for the clip 2 (non-tube side). In this case the support could be slightly lifted from the dummy base plate due to the non-concentricity of the HX.</td></tr></tbody></table>			STEP	OFF-LINE MEASUREMENT STEPS	1	Clean screws and washers in an Isopropyl Alcohol bath	2	Let the screws and washers dry on a clean towel	3	Perform a screws and washers visual Inspection	4	Install the HX supports on the HX dummy support plate fasten by hand the screws of the intended tube side of the HX and torque with tool to 75% of the final torque value	5	Fasten the screws of the support on the non-tube by hand loosely so 2 mm room is left between bolt and support	6	Install the HX on top of the supports in the correct orientation	7	Install the clip on the HX tubes side on the HX support. Fasten the clip screws alternating by hand.	8	Torque the 4 bolts to a value of 80% of the final torque	9	Measure on both sides the room between clip and support with spacers (thickness gauging tools)	10	Design & manufacture shims for the side with the largest spacer thickness based on the measured spacer thickness.	11	With clip 1 still installed perform the steps 8-10 for the clip 2 (non-tube side). In this case the support could be slightly lifted from the dummy base plate due to the non-concentricity of the HX.		
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20. OPER
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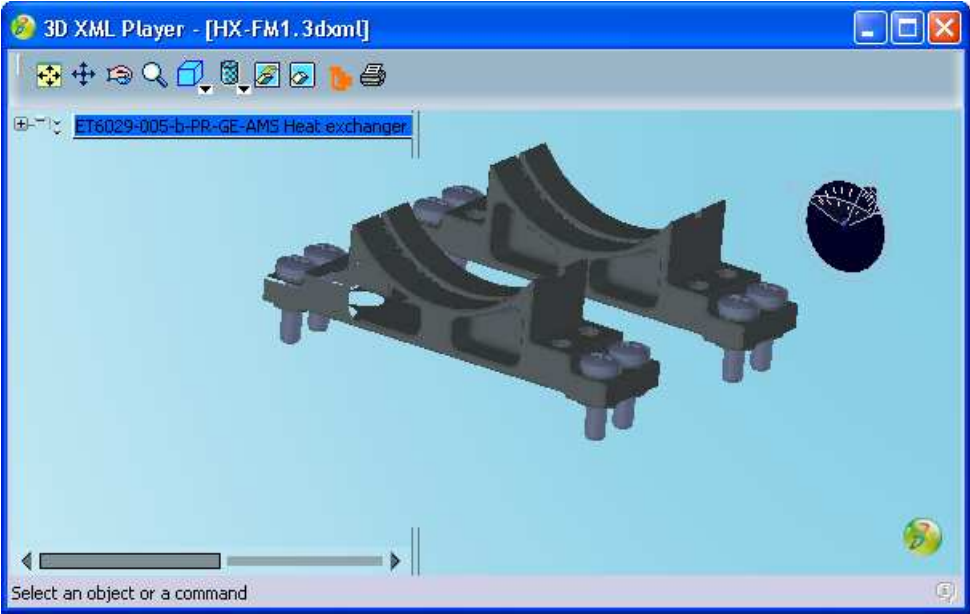
VERIFICATION

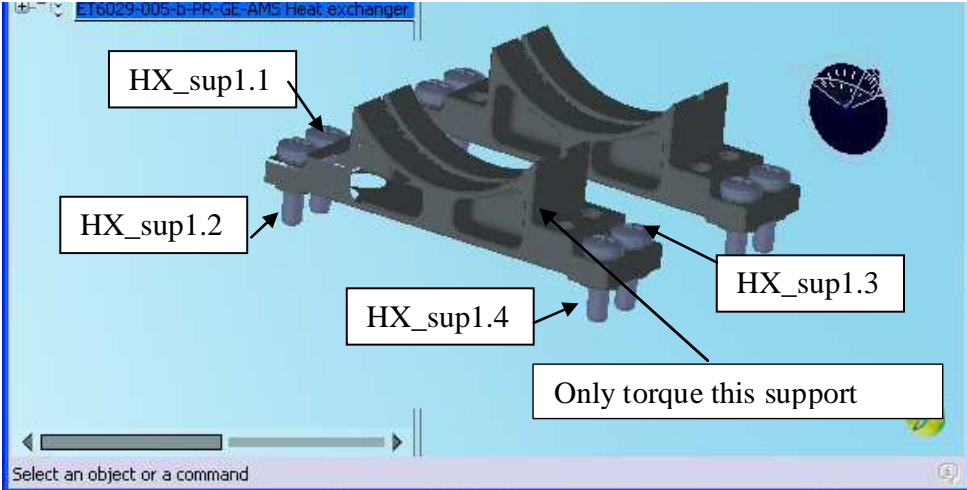
22. TECH

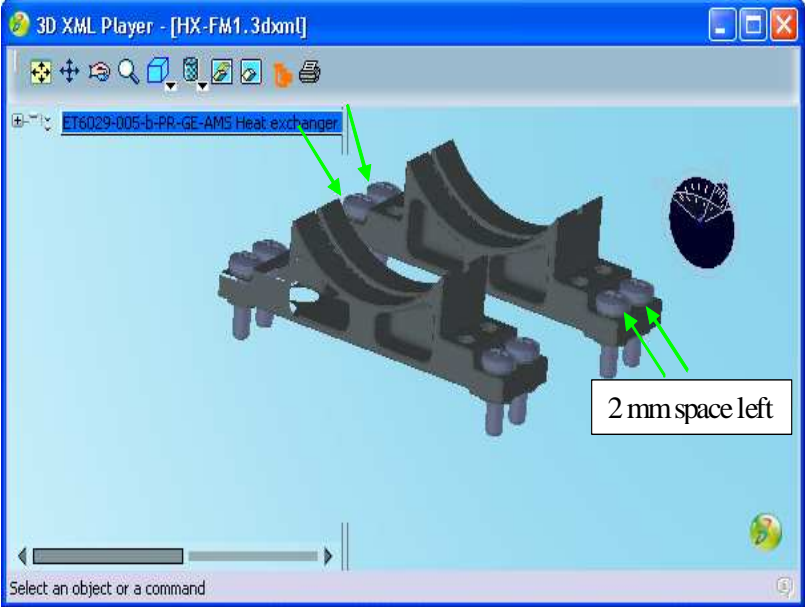
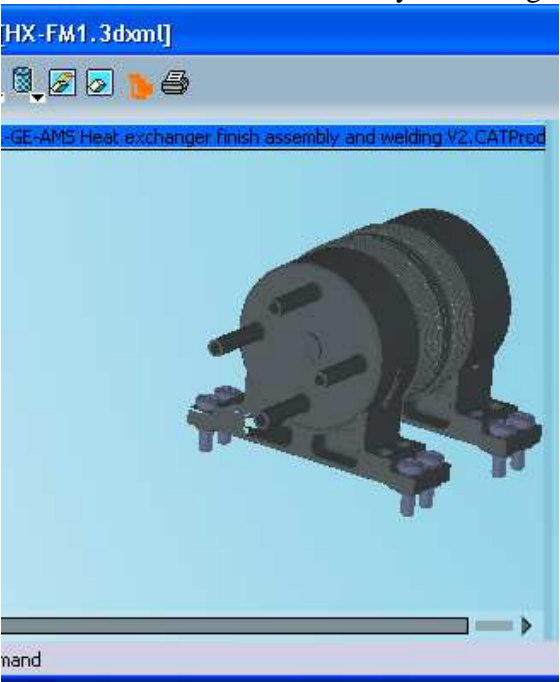
23. QA/DV

12	When still installed measure the gaps (dislocation) of the HX support (at the non-tube side) compared to the dummy base plate by spacers (thickness gauging tool). Perform this for all 4 bolts individually.
13	Design and manufacture washers with a thickness of the washers at the tube side plus the measured thickness by the spacers (4 or 2 sizes depending on the results)
	OFF-LINE INSTALLATION STEPS
1	Install the HX supports with correct washers (AS DESIGNED ABOVE) on the HX dummy support plate fasten by hand the screws of both supports to 75% of the final torque value
2	Install the HX on top of the supports in the correct orientation
3	Install the clip AND SHIMS on the HX tubes side on the HX support. Fasten the clip screws alternating by hand.
4	Measure the Locking Torque and register the value in the <u>Integration Procedure Tables</u> The <u>Integration Procedure Tables</u> are part of the present document Torque the 4 bolts to a value to the final torque
5	With clip 1 still installed perform the steps 6-7 for the second clip (non-tube side).
6	De-install the HX supports from the HX dummy base plate
	ON-LINE OPERATION
1	Clean screws and washers in an Isopropyl Alcohol bath
2	Let the screws and washers dry on a clean towel
3	Perform a screws and washers visual Inspection
4	Install the HX-support assembly with the washers to the TTCB-P base plate
5	Measure the Locking Torque and register the value in the <u>Integration Procedure Tables</u> The <u>Integration Procedure Tables</u> are part of the present document
6	Torque the bolts to the final torque values

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				22. TECH	23. QA/DV										
1.	Open this ATS														
2.	Perform the following preparatory work.														
2.1	Prepare the TTCS HX for installation. Perform a visual inspection of the parts to be installed (HX); clean the parts to be installed (HX) with Isopropyl Alcohol and let the parts to be installed dry on the clean towel														
2.2	Prepare screws and washer to be used for the part installation. Perform a screws and washer visual inspection; clean screws and washers in an Isopropyl Alcohol bath and let screws and washers dry on a clean towel														
2.3	Perform a visual inspection of the TTCS Heat Exchanger; check the cleanliness of all the inserts. If necessary clean them with Isopropyl Alcohol														
2.4	Prepare the installation dummy plate for installation. Perform visual inspection and clean the part with Isopropyl Alcohol and let the part dry on a towel.														
2.5	Weight all the hardware to be installed, including fasteners. Record the weight														
	<table><tr><th>ITEM</th><th>WEIGHT</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>			ITEM	WEIGHT										
ITEM	WEIGHT														
	SCALE														
	PN _____ M# _____ Cal Date_____														
2.6	OFF-LINE MEASUREMENT STEPS														
2.6.1	HX Installation onto support.														
	WARNING: for HX FM1 installation reference drawings are:														

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		22. TECH	23. QA/DV
	Assembly drawing:..... ET6029-04-DR-031-F Clip drawing:..... ET6029-04-DR-019.1-H Support: ET6029-04-DR-019.2-H Verify before use the availability of the approved drawing revision 2.6.2 Check the bill of material in the assembly drawing. 2.6.3 Put the installation dummy plate on a flat surface. 2.6.4 Install the two HX supports on the dummy HX installation base plate as shown in the figure. Install bolts washers as on the figure below  <i>Figure 4: Installation of HX supports to dummy base plate</i> 2.6.5 Apply a thin layer of Grease, Braycote 601EF (C1), to the threads of each bolt prior the installation (as reported on the assembly drawings). Braycote Grease - PN _____ Lot# _____ Exp. Date _____ 2.7 Torque only the bolts of the support on the side where the tubes of the HX will be located to 75% of the final seating value (for positioning). Final torque values are shown in below table		

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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)		VERIFICATION																							
			22. TECH																							
			23. QA/DV																							
<table><tr><th rowspan="2">Dash Number</th><th colspan="2">Torque (in*lbF)</th></tr><tr><th>Max</th><th>Min</th></tr><tr><td>Screw NAS1351N3-10</td><td>42.2</td><td>35.9</td></tr></table> <p>Torque the fasteners installed in Step 2.7. Locking torque shall be 1-6 inch*lbF. (TBC) Final torque shall be 75% final seating torque = 31.65-26.93 inch*lbF above locking torque. 5% precision on torque.</p>  <p>Torque Wrench- Locking Torque</p> <p>PN _____ M# _____ Cal Due Date _____</p> <p>Torque Wrench- Final Torque</p> <p>PN _____ M# _____ Cal Due Date _____</p> <table><tr><td>Bolt</td><td>Locking Torque</td><td>Final Torque (for positioning)</td></tr><tr><td>HX-sup1.1</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup1.2</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup1.3</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup1.4</td><td>_____</td><td>_____</td></tr></table>				Dash Number	Torque (in*lbF)		Max	Min	Screw NAS1351N3-10	42.2	35.9	Bolt	Locking Torque	Final Torque (for positioning)	HX-sup1.1	_____	_____	HX-sup1.2	_____	_____	HX-sup1.3	_____	_____	HX-sup1.4	_____	_____
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2.7.1	<p>Leave the bolts on the other support untorqued and screw by hand until 2 mm is spacing is left in between bolt head and washer on the support.</p> 		
2.7.2	<p>Install the HX on the two-supports Orient the HX in the correct way according to AD 1.</p> 		

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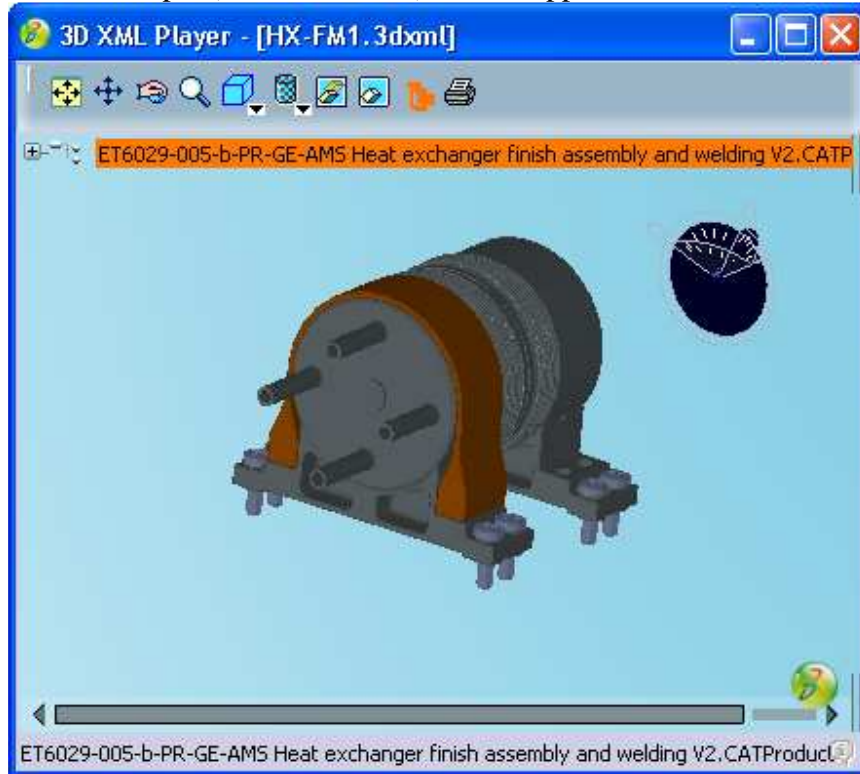
VERIFICATION

22. TECH

23. QA/DV

2.7.3

Install the clip 1 (on the tube side) on the support



2.7.4

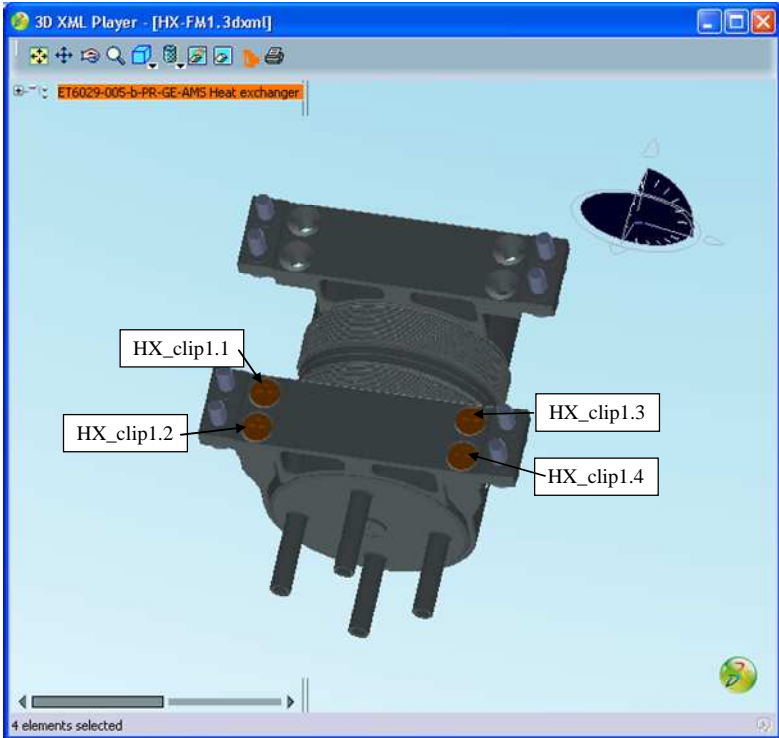
Apply a thin layer of **Grease, Braycote 601EF (C1)**, to the threads of each bolt prior the installation (as reported on the assembly drawings)

2.7.5

Fasten the screws alternating on both sides by hand and torque to 80% of the total torque.

Dash Number	Torque (in*lb)	
	Max	Min
Screw MS24694C52	10.6	9

Torque the fasteners installed in Step 2.7.3. Locking torque shall be 1-6 inch*lb. (TBC) Final torque shall be 80% **final seating torque = 8.48-6.75 inch*lb above locking torque.**
5% precision on torque.

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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)		VERIFICATION															
			22. TECH															
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	<p>Torque Wrench- Locking Torque</p> <p>PN _____ M# _____ Cal Due Date _____</p> <p>Torque Wrench- Final Torque</p> <p>PN _____ M# _____ Cal Due Date _____</p> <div></div> <table><thead><tr><th>Bolt</th><th>Locking Torque</th><th>Final Torque (for positioning)</th></tr></thead><tbody><tr><td>HX-clip1.1</td><td>_____</td><td>_____</td></tr><tr><td>HX-clip1.2</td><td>_____</td><td>_____</td></tr><tr><td>HX-clip1.3</td><td>_____</td><td>_____</td></tr><tr><td>HX-clip1.4</td><td>_____</td><td>_____</td></tr></tbody></table> <p>2.7.6 Measure the shim thickness between clip and support on both sides of clip 1 with spacers (thickness gauging tools). Spacer thickness is {(Thickness left + thickness right)-2*0.01"}/2. In case the spacer thickness < 0.01" use only 1 spacer In case spacer thickness < 0.005" use no spacers In case spacer thickness is < 0 machine off the clips so there is a gap of 0.005"</p>		Bolt	Locking Torque	Final Torque (for positioning)	HX-clip1.1	_____	_____	HX-clip1.2	_____	_____	HX-clip1.3	_____	_____	HX-clip1.4	_____	_____	
Bolt	Locking Torque	Final Torque (for positioning)																
HX-clip1.1	_____	_____																
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HX-clip1.4	_____	_____																

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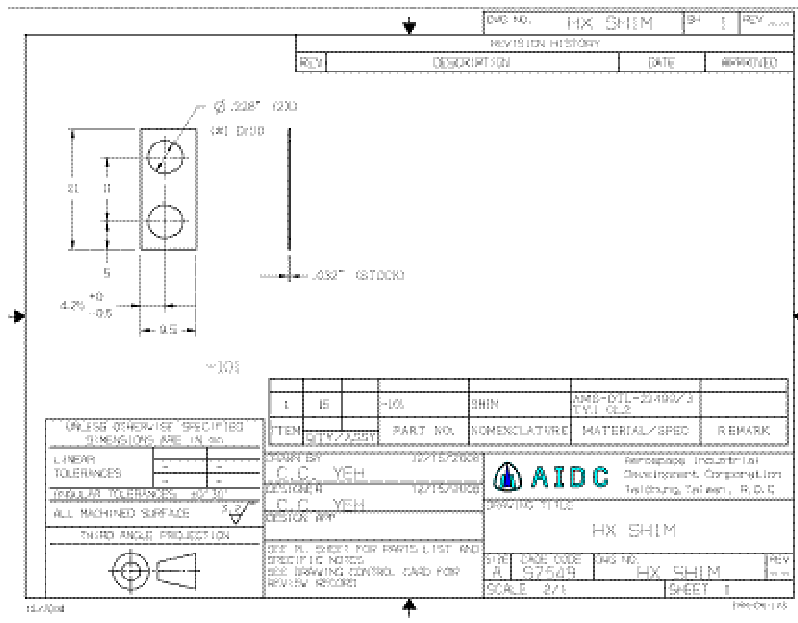
VERIFICATION

22. TECH

23. QA/DV

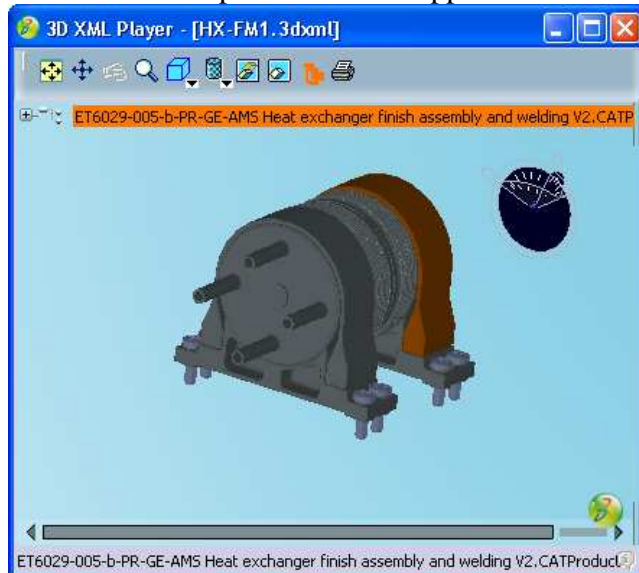
2.7.7

Machine spacers according to drawing with thickness as measured in above step.



2.7.8

Install second clip 2 on the HX support



2.7.9

Apply a thin layer of Grease, Braycote 601EF (C1), to the threads of each bolt prior the installation

2.7.10

Fasten the screws alternating on both sides by hand and torque to 80% of the total torque.

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Dash Number	Torque (in*lbF)	
	Max	Min
Screw MS24694C52	10.6	9

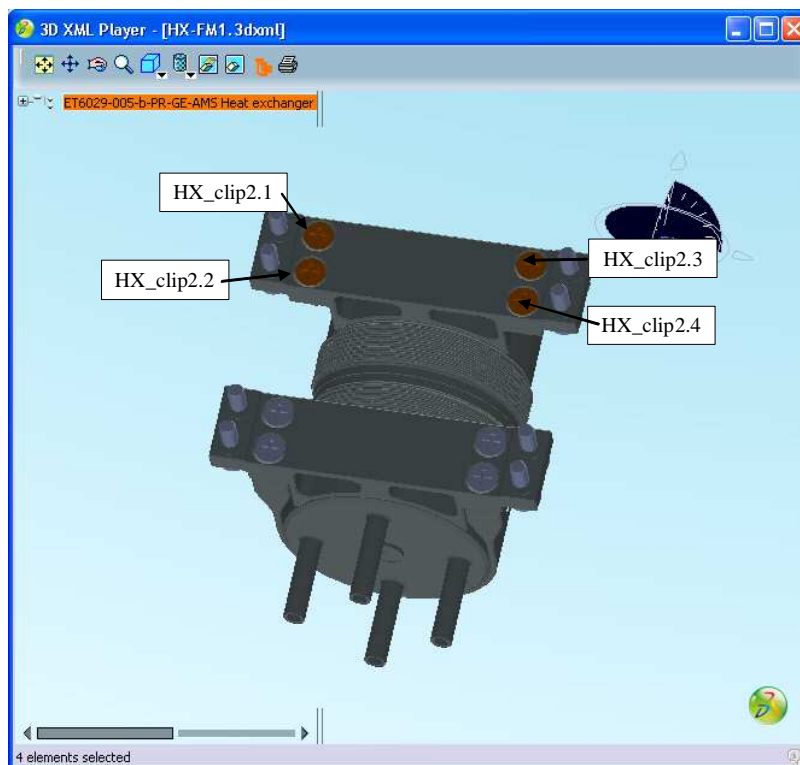
Torque the fasteners installed in Step 2.7.8. Locking torque shall be 1-6 inch*lbF. (TBC) Final torque shall be 80% **final seating torque = 8.48-6.75 inch*lbF above locking torque.**
5% precision on torque.

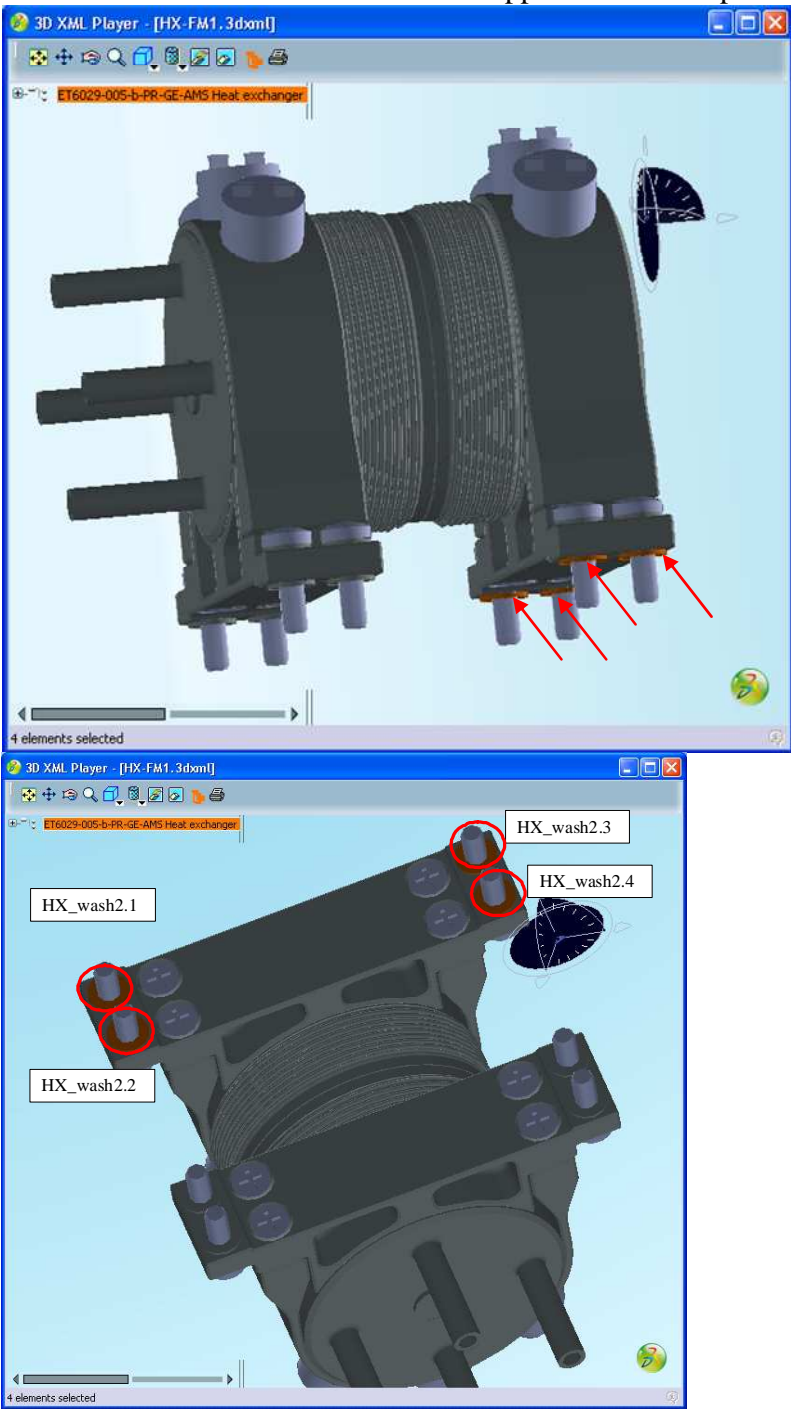
Torque Wrench- Locking Torque

PN _____ M# _____ Cal Due Date _____

Torque Wrench- Final Torque

PN _____ M# _____ Cal Due Date _____



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2.7.13	Perform washer measurements on the support to the base plate connection 		

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23. QA/DV

Washer Thickness

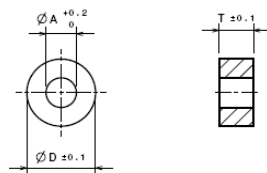
HX-wash2.1 _____

HX-wash2.2 _____


HX-wash2.3 _____

HX-wash2.4 _____

- 2.7.14 Manufacture and washers according to the thicknesses measured in the former step. Starting point is ET5998-06-15.8.

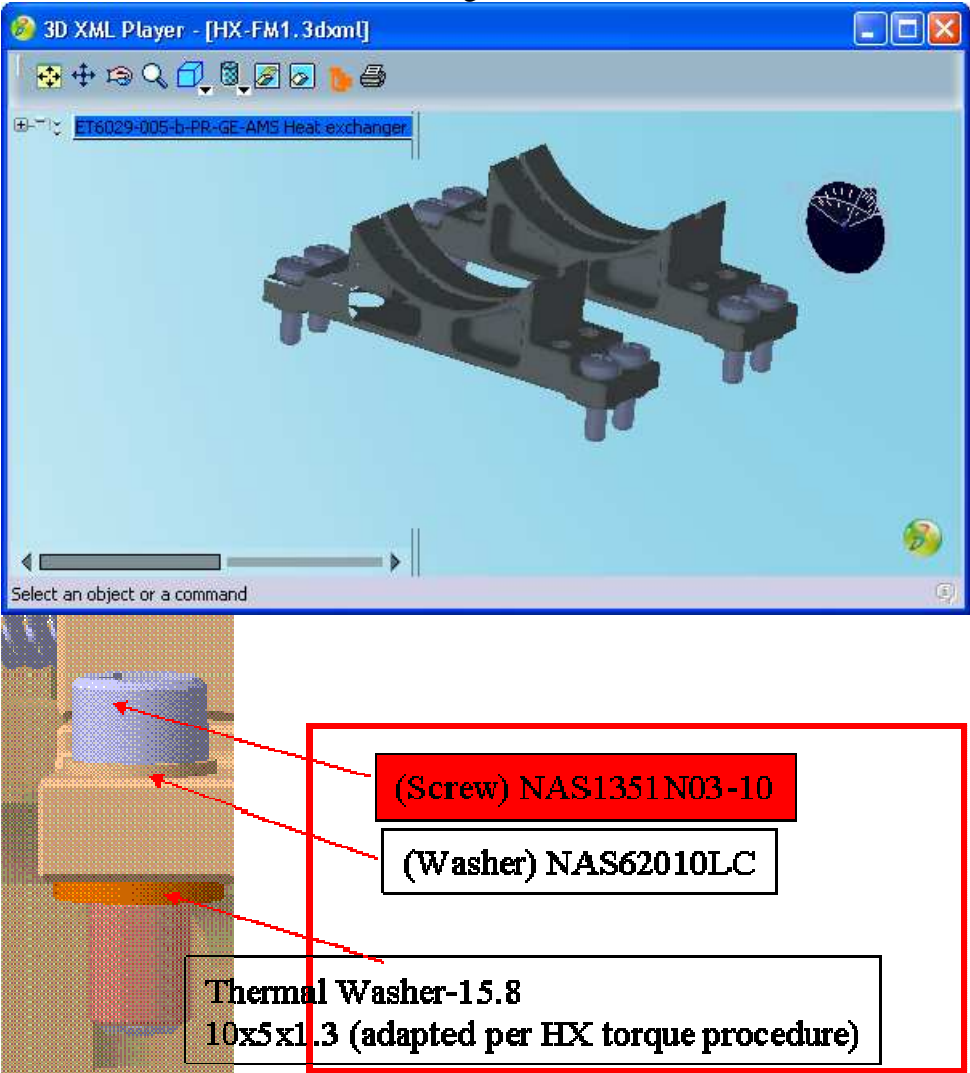
ROUGHNESS: $3.2 \sqrt{\text{ }}$

REMOVE
SHARP EDGES
UNLESS OTHERWISE INDICATED

D X A X T				
15.8	8	THERMAL WASHER 10x5x1.3	T16A14V	
15.7	53	THERMAL WASHER 14x6.7x4	T16A14V	
15.6	11	THERMAL WASHER 14x6.7x3	T16A14V	
15.5	32	THERMAL WASHER 12.8x5x4	T16A14V	
15.4	8	THERMAL WASHER 10x5x5	T16A14V	
15.3	8	THERMAL WASHER 10x5x3	T16A14V	
15.2	8	THERMAL WASHER 10x4.4x5	T16A14V	
15.1	8	THERMAL WASHER 10x4.4x3	T16A14V	
PART NO.	QTY.	PART	MATERIAL	REMARKS
SCALE: 2:1		CHECKED: K.VD.WETERING		
DATE: 2008-01-15		APPROVED: J. V. ES		
DESIGNED:				
DRAWN: P. PUL		ISSUE	DATE	DRAWN APPR.
PROJECT: AMS TTCS				
SUBJECT: TTCBP FM: THERMAL WASHERS				
 NATIONAL AEROSPACE LABORATORY		PROJECT - CHAPTER NO.: ET5998-06		DRW. NO.: 15
		SIZE: A4	CATIA DRAWN	ISSUE: -

- 2.7.15 Unbolt the Clip 1 and Clip 2

- 2.7.16 **END OF OFF-LINE MEASUREMENT STEPS**

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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)	VERIFICATION	
		22. TECH	23. QA/DV
2.7.17	OFF-LINE INSTALLATION STEPS 2.7.18 Put the installation dummy plate on a flat surface. 2.7.19 Install the two HX supports on the dummy HX installation base plate as shown in the figure. Install all 8 bolts washers as on the figure below		
			
	<i>Figure 4: Installation of HX supports to dummy base plate</i> Install on clip 2 the washers as measured in step 2.7.13.		
2.7.20	Apply a thin layer of Grease, Braycote 601EF (C1), to the threads of each bolt prior the installation (as reported on the assembly drawings). Braycote Grease - PN _____ Lot# _____ Exp. Date _____		

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(Print, Type, or Write Legibly)

VERIFICATION

22. TECH

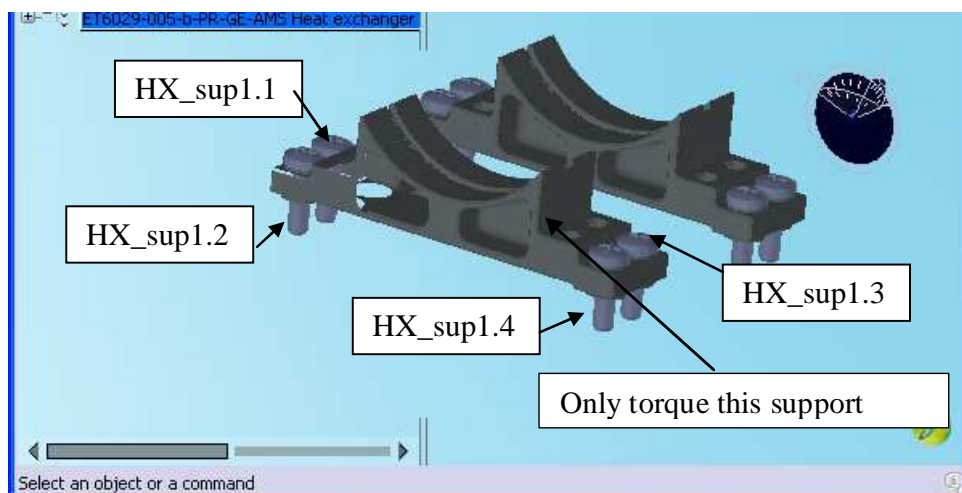
23. QA/DV

2.8

Torque only the bolts of the support on the side (support 1) where the tubes of the HX will be located to 75% of the final seating value (for positioning).
Final torque values are shown in below table

Dash Number	Torque (in*lbF)	
	Max	Min
Screw NAS1351N3-10	42.2	35.9

Torque the fasteners installed in Step 2.7. Locking torque shall be 1-6 inch*lbF.
(TBC) Final torque shall be 75% final seating torque = 31.65-26.93 inch*lbF
above locking torque.
5% precision on torque.


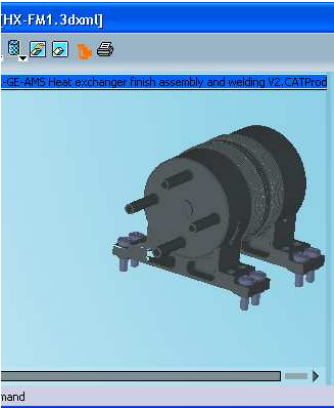


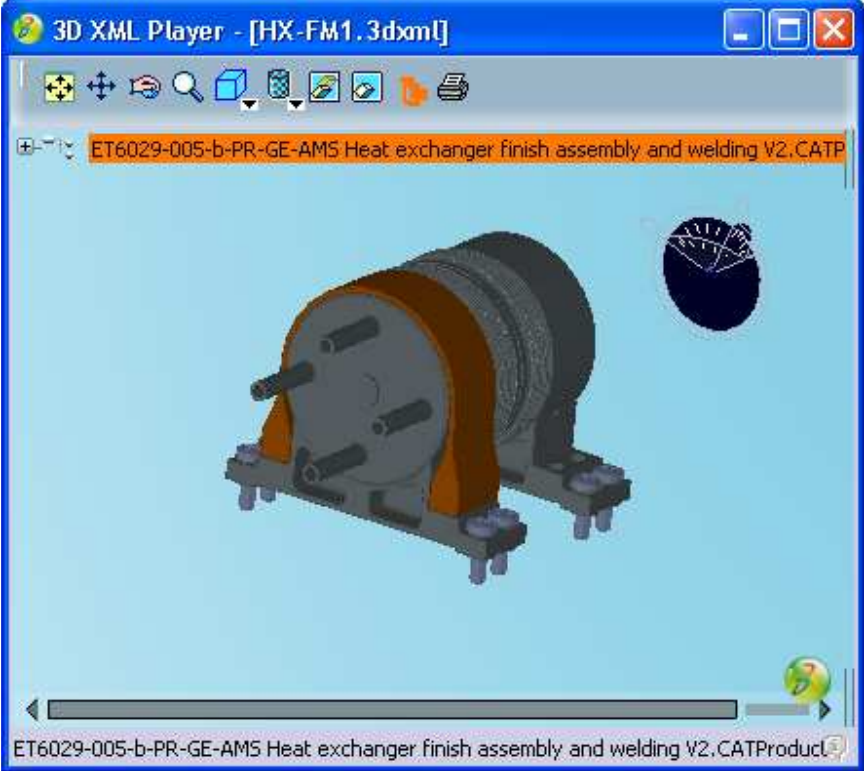
Torque Wrench- Locking Torque

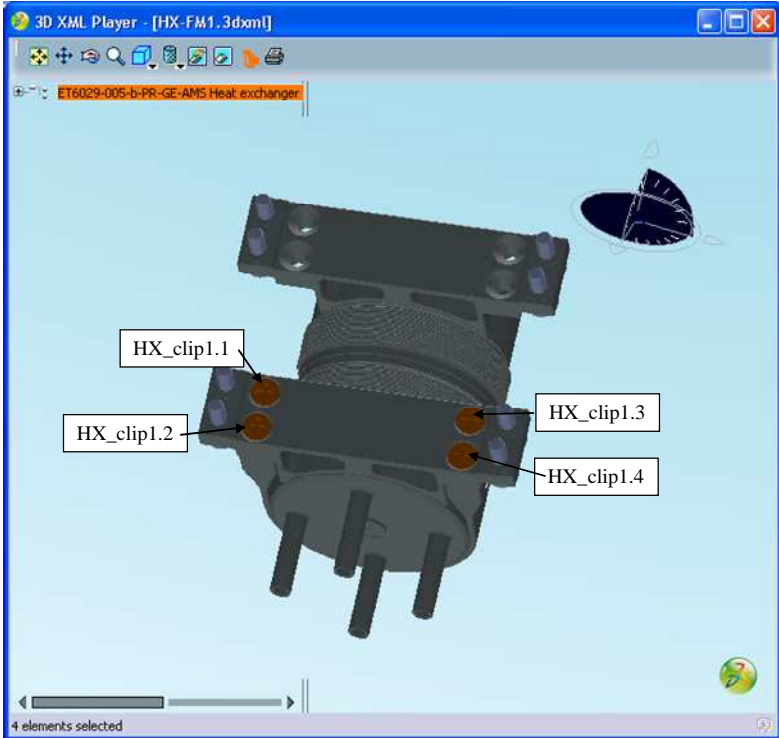
PN _____ M# _____ Cal Due Date _____

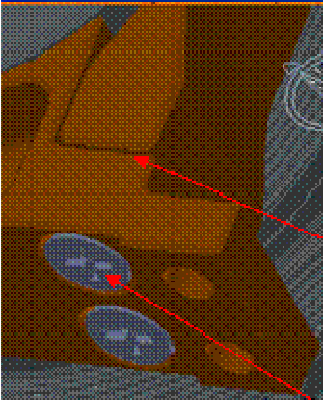
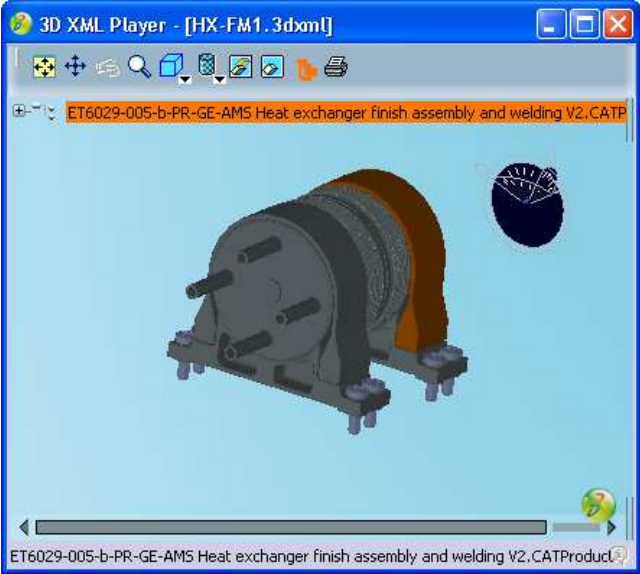
Torque Wrench- Final Torque

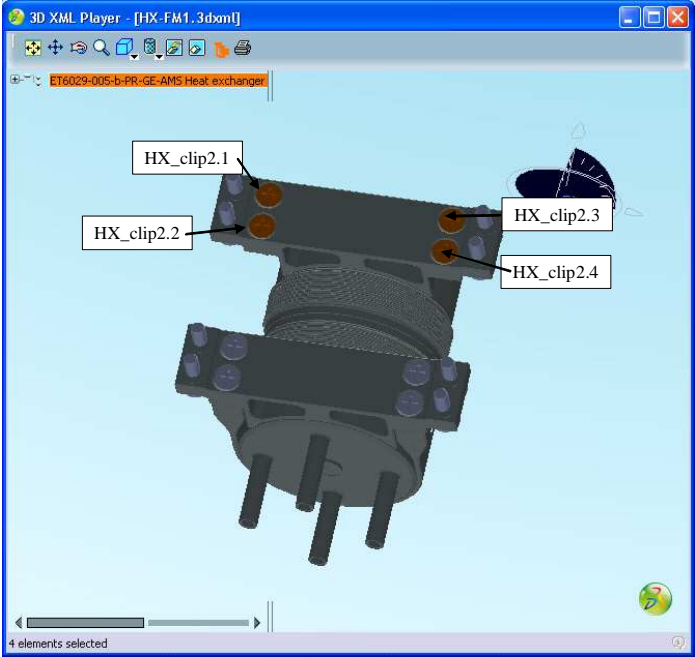
PN _____ M# _____ Cal Due Date _____

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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)		VERIFICATION														
		22. TECH	23. QA/DV														
	<table border="0"> <thead> <tr> <th>Bolt</th> <th>Locking Torque</th> <th>Final Torque (for positioning)</th> </tr> </thead> <tbody> <tr> <td>HX-sup1.1</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>HX-sup1.2</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>HX-sup1.3</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>HX-sup1.4</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>	Bolt	Locking Torque	Final Torque (for positioning)	HX-sup1.1	_____	_____	HX-sup1.2	_____	_____	HX-sup1.3	_____	_____	HX-sup1.4	_____	_____	
Bolt	Locking Torque	Final Torque (for positioning)															
HX-sup1.1	_____	_____															
HX-sup1.2	_____	_____															
HX-sup1.3	_____	_____															
HX-sup1.4	_____	_____															
2.8.1	Leave the bolts on support 2 untorqued and screw by hand until 2 mm is spacing is left in between bolt head and washer on the support. 																
2.8.2	Install the HX on the two-supports Orient the HX in the correct way according to AD 1. 																
	Install the clip 1 (on the tube side) on the support																

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001
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			22. TECH 23. QA/DV
	 <div data-bbox="624 1402 1295 1751" style="border: 2px solid red; padding: 10px; margin-top: 10px;"> <p>HX Clip shim as per HX torque procedure</p> <p>(Screw) MS24694C52</p> </div>		
2.8.3	Apply a thin layer of Grease, Braycote 601EF (C1) , to the threads of each bolt prior the installation (as reported on the assembly drawings		
2.8.4	Fasten the screws alternating on both sides by hand and torque to the final torque value.		

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001									
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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)		VERIFICATION									
			22. TECH	23. QA/DV								
2.8.5	<table><tr><th rowspan="2">Dash Number</th><th colspan="2">Torque (in*lbF)</th></tr><tr><th>Max</th><th>Min</th></tr><tr><td>Screw MS24694C52</td><td>10.6</td><td>9</td></tr></table> <p>Torque the fasteners installed in Step 2.7.3. Locking torque shall be 1-6 inch*lbF. (TBC) Final torque shall be final seating torque = 10.6-9 inch*lbF above locking torque. 5% precision on torque.</p>		Dash Number	Torque (in*lbF)		Max	Min	Screw MS24694C52	10.6	9		
	Dash Number	Torque (in*lbF)										
Max		Min										
Screw MS24694C52	10.6	9										
	Torque Wrench- Locking Torque PN _____ M# _____ Cal Due Date _____ Torque Wrench- Final Torque PN _____ M# _____ Cal Due Date _____											
												

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001		
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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)			VERIFICATION	
				22. TECH	23. QA/DV
2.8.6	Bolt	Locking Torque	Final Torque (for positioning)		
	HX-clip1.1	_____	_____		
	HX-clip1.2	_____	_____		
	HX-clip1.3	_____	_____		
	HX-clip1.4	_____	_____		
	Install second clip 2 on the HX support				
	<div></div> <div><div>HX Clip shim as per HX torque procedure</div><div>(Screw) MS24694C52</div></div>				

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001						
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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)	VERIFICATION							
		22. TECH	23. QA/DV						
2.8.7	Apply a thin layer of Grease, Braycote 601EF (C1), to the threads of each bolt prior the installation								
2.8.8	Fasten the screws alternating on both sides by hand and torque to the final torque value. <table><tr><th rowspan="2">Dash Number</th><th colspan="2">Torque (in*lbf)</th></tr><tr><th>Max</th><th>Min</th></tr><tr><td>Screw MS24694C52</td><td>10.6</td><td>9</td></tr></table> Torque the fasteners installed in Step 2.7.8. Locking torque shall be 1-6 inch*lbf. (TBC) Final torque shall be the final seating torque = 10.6-9 inch*lbf above locking torque. 5% precision on torque. Torque Wrench- Locking Torque PN _____ M# _____ Cal Due Date _____ Torque Wrench- Final Torque PN _____ M# _____ Cal Due Date _____ 			Dash Number	Torque (in*lbf)		Max	Min	Screw MS24694C52
Dash Number	Torque (in*lbf)								
	Max	Min							
Screw MS24694C52	10.6	9							

AMS-02 TASK SHEET (ATS)

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TTCS-BOX-HX-001

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VERIFICATION

22. TECH

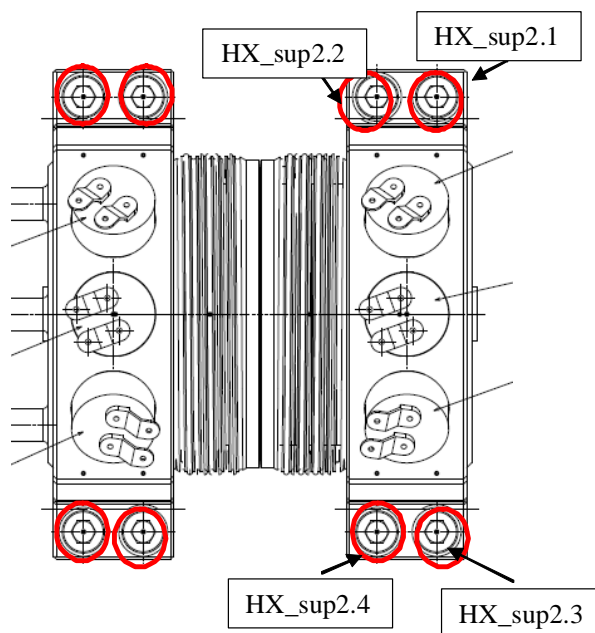
23. QA/DV

Bolt	Locking Torque	Final Torque
HX-clip2.1	_____	_____
HX-clip2.2	_____	_____
HX-clip2.3	_____	_____
HX-clip2.4	_____	_____

- 2.9 Torque the bolts of support 2 to 75% of the final seating value (for positioning).
Final torque values are shown in below table

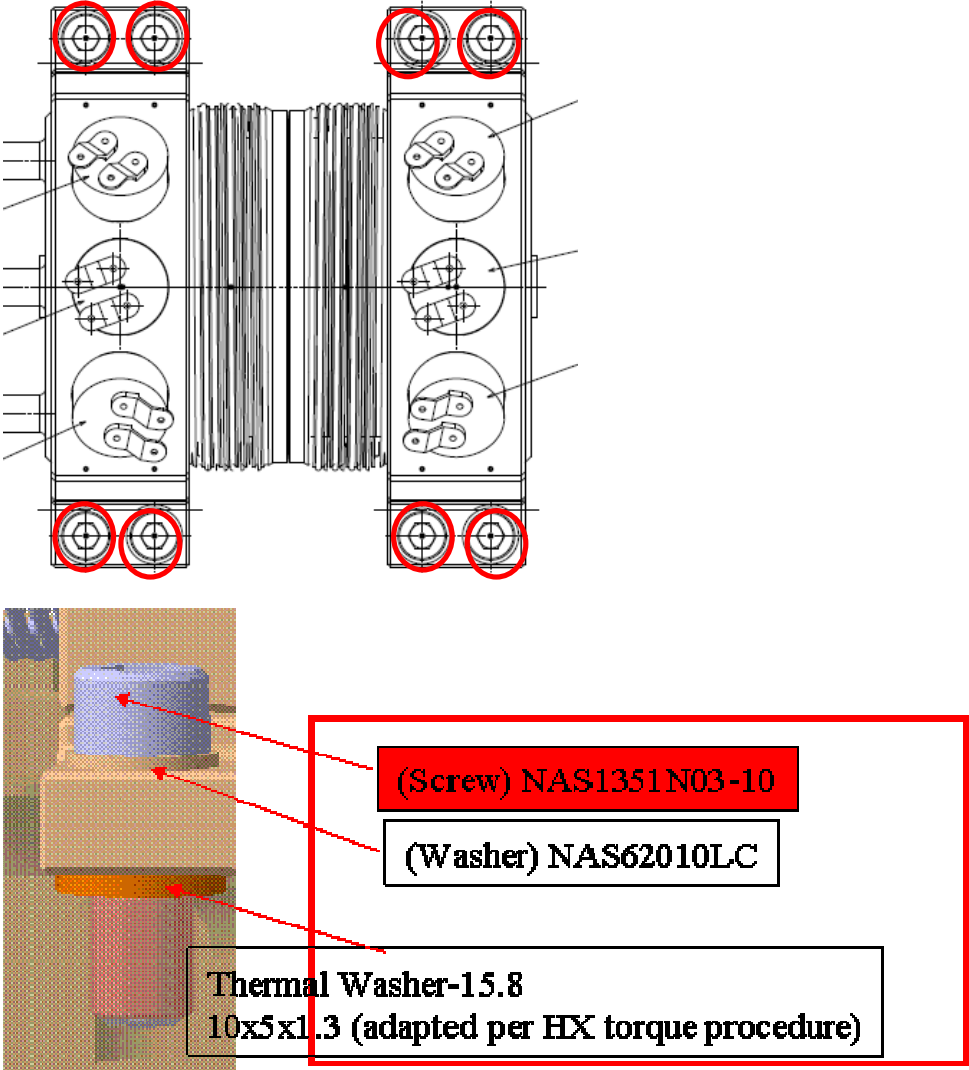
Dash Number	Torque (in*lb)	
	Max	Min
Screw NAS1351N3-10	42.2	35.9

Torque the fasteners installed in Step 2.7. Locking torque shall be 1-6 inch*lb.
(TBC) Final torque shall be 75% final seating torque = 31.65-26.93 inch*lb
above locking torque.
5% precision on torque.



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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001		
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				22. TECH	23. QA/DV
2.9.1	Torque Wrench- Locking Torque				
	PN _____ M# _____ Cal Due Date_____				
	Torque Wrench- Final Torque				
	PN _____ M# _____ Cal Due Date_____				
	Bolt Locking Torque Final Torque (for positioning)				
	HX-sup2.1 _____ _____				
	HX-sup2.2 _____ _____				
	HX-sup2.3 _____ _____				
	HX-sup2.4 _____ _____				
	END OF OFF-LINE INSTALLATION STEPS				

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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001										
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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)	VERIFICATION											
		22. TECH	23. QA/DV										
2.9.2	ON-LINE STEPS												
2.10	De-install the TTCS HX from the dummy HX installation plate.												
2.11	Prepare the TTCS HX for installation. Perform a visual inspection of the parts to be installed (HX); clean the parts to be installed (HX) with Isopropyl Alcohol and let the parts to be installed dry on the clean towel												
2.12	Prepare screws and washer to be used for the part installation. Perform a screws and washer visual inspection; clean screws and washers in an Isopropyl Alcohol bath and let screws and washers dry on a clean towel												
2.13	Perform a visual inspection of the TTCS Heat Exchanger; check the cleanliness of all the inserts. If necessary clean them with Isopropyl Alcohol												
2.14	Prepare the installation dummy plate for installation. Perform visual inspection and clean the part with Isopropyl Alcohol and let the part dry on a towel.												
2.15	Weight all the hardware to be installed, including fasteners. Record the weight <table><tr><th>ITEM</th><th>WEIGHT</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> SCALE PN _____ M# _____ Cal Date _____	ITEM	WEIGHT										
ITEM	WEIGHT												
2.16	INSTALLATION OF HX ONTO THE TTCB BASE PLATE WARNING: for HX FM1 installation reference drawings are: Assembly drawing:..... ET6029-04-DR-031-F Clip drawing:..... ET6029-04-DR-019.1-H Support: ET6029-04-DR-019.2-H												

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		22. TECH	23. QA/DV
	<p>Verify before use the availability of the approved drawing revision</p> <p>2.16.1 Check the bill of material in the assembly drawing.</p> <p>2.16.2 Install the two HX supports on the TTCB base plate as shown in the figure below.</p> <div></div> <p>Figure 4: Installation of HX supports to dummy base plate</p> <p>2.16.3 Apply a thin layer of Grease, Braycote 601EF (C1), to the threads of each bolt prior the installation (as reported on the assembly drawings).</p> <p>Braycote Grease - PN _____ Lot# _____ Exp. Date _____</p>		

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VERIFICATION

22. TECH

23. QA/DV

2.17 Install the fasteners as per figure 4 and record fasteners lot number

n.4 BOLTS NAS1351N03-10 LOT# _____

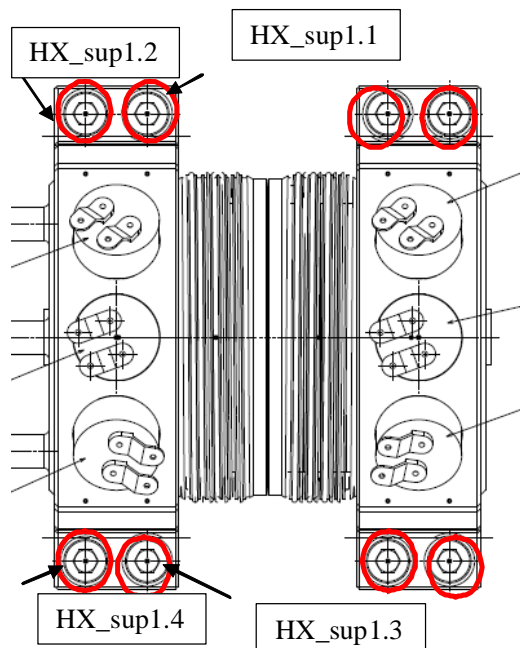
n.4 WASHERS NAS62010LC LOT# _____

n.4 WASHERS ET5998-06-15.8 LOT# _____

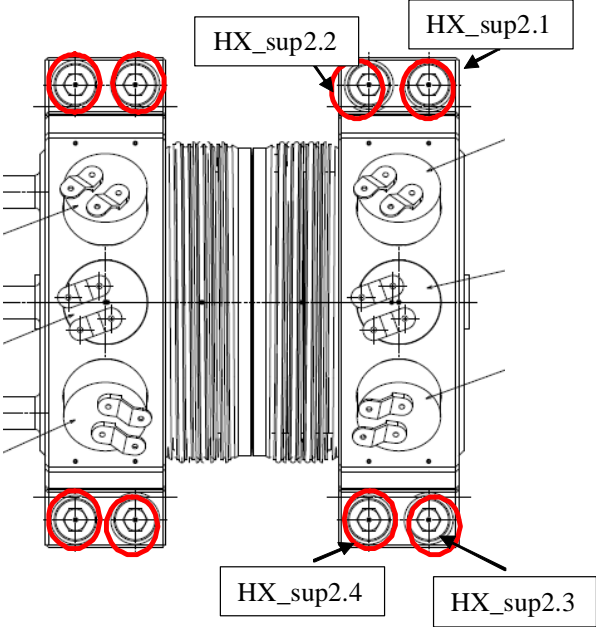
2.18 Torque the bolts of the support on the side where the tubes of the HX will be located to the final seating value. Final torque values are shown in below table

Dash Number	Torque (in*lb)	
	Max	Min
Screw NAS1351N3-10	42.2	35.9

Torque the fasteners installed in Step 2.7. Locking torque shall be 1-6 inch*lb.
(TBC) Final torque shall be 42.2-35.9 inch*lb above locking torque.
5% precision on torque.



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AMS-02 TASK SHEET (ATS) CONTINUATION PAGE		4. ATS NO.	TTCS-BOX-HX-001																									
		6. MOD NO.																										
20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)			VERIFICATION																								
				22. TECH	23. QA/DV																							
	<p>Torque Wrench- Locking Torque</p> <p>PN _____ M# _____ Cal Due Date_____</p> <p>Torque Wrench- Final Torque</p> <p>PN _____ M# _____ Cal Due Date_____</p> <table><tr><td>Bolt</td><td>Locking Torque</td><td>Final Torque (for positioning)</td></tr><tr><td>HX-sup1.1</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup1.2</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup1.3</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup1.4</td><td>_____</td><td>_____</td></tr></table> <p>End HX support 1 installation</p> <p>2.19 Install the fasteners support 2 as per figure 4 and record fasteners lot number</p> <p>n.4 BOLTS NAS1351N03-10 LOT#_____</p> <p>n.4 WASHERS NAS62010LC LOT#_____</p> <p>n.4 WASHERS ET5998-06-15.8 LOT#_____</p> <p>with thicknesses as determined in off-line step 2.7.13</p> <p>2.19.1 Apply a thin layer of Grease, Braycote 601EF (C1), to the threads of each bolt prior the installation (as reported on the assembly drawings).</p> <p>Braycote Grease - PN _____ Lot#_____ Exp. Date _____</p> <p>2.20 Torque the bolts of the support 2 of the HX to the final seating value. Final torque values are shown in below table</p> <table><tr><th rowspan="2">Dash Number</th><th colspan="2">Torque (in*lbF)</th></tr><tr><th>Max</th><th>Min</th></tr><tr><td>Screw NAS1351N3-10</td><td>42.2</td><td>35.9</td></tr></table>			Bolt	Locking Torque	Final Torque (for positioning)	HX-sup1.1	_____	_____	HX-sup1.2	_____	_____	HX-sup1.3	_____	_____	HX-sup1.4	_____	_____	Dash Number	Torque (in*lbF)		Max	Min	Screw NAS1351N3-10	42.2	35.9		
Bolt	Locking Torque	Final Torque (for positioning)																										
HX-sup1.1	_____	_____																										
HX-sup1.2	_____	_____																										
HX-sup1.3	_____	_____																										
HX-sup1.4	_____	_____																										
Dash Number	Torque (in*lbF)																											
	Max	Min																										
Screw NAS1351N3-10	42.2	35.9																										

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20. OPER SEQ. NO.	21. OPERATIONS (Print, Type, or Write Legibly)		VERIFICATION															
			22. TECH															
			23. QA/DV															
	<p>Torque the fasteners installed in Step 2.7. Locking torque shall be 1-6 inch*lb^f. (TBC) Final torque shall be 42.2-35.9 inch*lb^f above locking torque. 5% precision on torque.</p> <div></div> <p>Torque Wrench- Locking Torque</p> <p>PN _____ M# _____ Cal Due Date _____</p> <p>Torque Wrench- Final Torque</p> <p>PN _____ M# _____ Cal Due Date _____</p> <table><thead><tr><th>Bolt</th><th>Locking Torque</th><th>Final Torque (for positioning)</th></tr></thead><tbody><tr><td>HX-sup2.1</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup2.2</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup2.3</td><td>_____</td><td>_____</td></tr><tr><td>HX-sup2.4</td><td>_____</td><td>_____</td></tr></tbody></table> <p>2.20.1 End of online operations</p>			Bolt	Locking Torque	Final Torque (for positioning)	HX-sup2.1	_____	_____	HX-sup2.2	_____	_____	HX-sup2.3	_____	_____	HX-sup2.4	_____	_____
Bolt	Locking Torque	Final Torque (for positioning)																
HX-sup2.1	_____	_____																
HX-sup2.2	_____	_____																
HX-sup2.3	_____	_____																
HX-sup2.4	_____	_____																